

LISTING OF CLAIMS

1. (Currently amended) A process for manufacturing gas diffusion electrodes, which process comprises:

- a) treating an a restricted area of a pre-shrunk porous hydrophobic substrate wherein said area is less hydrophobic than a surrounding area of said substrate, so as to restrict the a slurry deposited in step b) to the said area
- b) dispensing a slurry of catalyst onto the restricted area,
- c) removing liquid from the dispensed slurry, and
- d) treating the dried slurry to remove organic materials.

2. (Currently amended) A process as in claim 1 wherein step a) comprises further comprising forming a well at the said area in the pre-shrunk porous hydrophobic substrate to form said restricted area.

3. (Cancelled)

4. (Currently amended) A process as in claim 2 1 wherein step a) which comprises (i) forming a said well in the pre-shrunk porous hydrophobic substrate and (ii) surface after treating the restricted area hydrophobic substrate to render the substrate that is in the well or is destined to be within the well less hydrophobic.

5. (Cancelled)

6. (Cancelled)

7. (Previously amended) A process as claimed in claim 1, wherein step c) comprises heating the slurry to evaporate the liquid.

8. (Previously amended) A process as claimed in claim 1 wherein step d) comprises heating the dried slurry to a temperature sufficient to decompose the organic materials.

9. (Previously amended) A process as in claim 1, where step c) is achieved by solidifying the liquid.

10. (Previously amended) A process as claimed in claim 1, which includes pre-shrinking the hydrophobic substrate by heat treatment at a temperature greater than that used in either of steps c) or d).

11. (Previously amended) A process as claimed in claim 1, which includes a further step of: e) cutting the catalyst deposit and the underlying portion of substrate from the rest of the hydrophobic substrate to provide a porous and conductive catalyst mass supported on the said portion of the substrate.

12. (Previously amended) A process as claimed in claim 1, wherein the hydrophobic substrate is PTFE.

13. (Previously amended) A process as claimed in claim 1 wherein (c) and (d) steps are performed in a single step.

14. (Cancelled)

15. (Cancelled)

16. (New) A process for manufacturing gas diffusion electrodes comprising:

a) heat treating a microporous hydrophobic PTFE sheet to a temperature between 280 to 310⁰C to form a pre-shrunk porous hydrophobic substrate,

b) forming a well area in said heat treated PTFE sheet,

c) treating the well area to increase the surface energy of the well area by at least 10 to 15 dynes/cm² so that said well area is less hydrophobic than a surrounding area of said PTFE sheet,

d) dispensing an aqueous slurry of catalyst into the treated well area,

e) drying the aqueous slurry to remove water therefrom, and

f) curing the dried slurry to remove organic materials.

17. (New) The process of claim 16 wherein the slurry contains about 10 to 25% by weight of the catalyst, the slurry is dried at a temperature of 80-85⁰ C for about 10 minutes, and is cured by raising the temperature from the drying temperature at 5⁰C per minute until it reaches 290⁰C and is held at 290⁰C for about 80 minutes.

18. (New) The process of claim 16 which further comprises stamping the cured dried slurry to provide an electrode, removing the electrode from the well and lightly pressing the removed electrode.

19. (New) The process of claim 17 which further comprises stamping the cured dried slurry to provide an electrode, removing the electrode from the well and lightly pressing the removed electrode with a force of about 600-900 N per 17 mm.

20. (New) A gas diffusion electrode which has been prepared by providing
a pre-shrunk microporous PTFE substrate with a confined area that is less
hydrophobic than a surrounding area of said substrate,
dispensing an aqueous catalyst slurry in the confined area, and
preparing the electrode from the slurry and the PTFE substrate in the confined area.

21. (New) The gas diffusion electrode of claim 20 wherein the confined area is plasma
treated prior to the slurry being dispensed, said slurry contains about 10 to 25% by weight of
a catalyst, the slurry is dried at a temperature of 80-85⁰ C for about 10 minutes, and is cured
by raising the temperature from the drying temperature at 5⁰C per minute until it reaches 290
⁰C and is held at 290 ⁰C for about 80 minutes, stamping the cured dried slurry to provide an
electrode, removing the electrode from the well and lightly pressing the removed electrode.